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Citizens' Bulletin

Volume 8 Number 7 March 1981 $3/yr.
The Connecticut Department of Environmental Protection

Surveys take an in-depth look at what goes down polluted rivers

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Citizens' Bulletin

March 1981

Volume 8 Number 7 $3/yr.

Cover Photo: Jenny Mead

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DEP Citizens' Bulletin
(USPS 041-570)

Published eleven times a year by the Department of Environmental Protection. Yearly subscription $3.00; two years, $5.00. 2nd class postage paid at Hartford, Connecticut. Funds are also provided through a federal grant from the Office of Coastal Zone Management under the Coastal Zone Management Act of 1972. Please forward any address change immediately.

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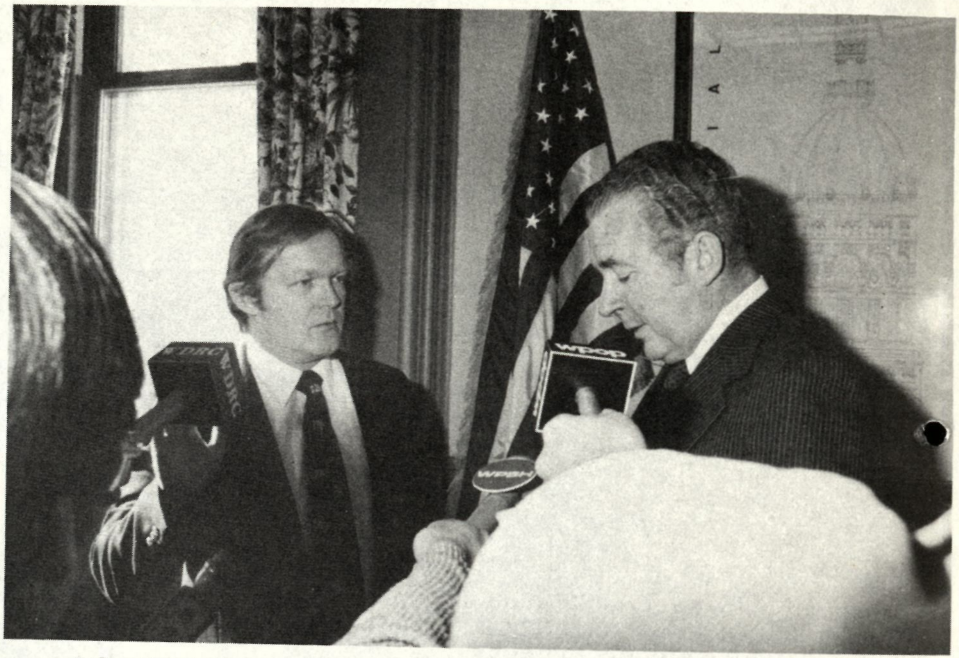


John W. Anderson of Newtown was sworn in as Deputy Commissioner of DEP's Division of Environmental Quality on January 8, 1981. Governor William O'Neill administered the oath of office.

Anderson, who was State Representative from the 106th District from 1974 to 1980, served as Chairman of the State Legislature's Environment Committee from 1976 through 1980. He has also served on the General Assembly's Advisory Committee for the Preservation of Farmlands, as chairman of its Solid Waste Task Force, and as chairman of its Oil Spill Task Force. Anderson was instrumental in the passage of Connecticut's "Bottle Bill."

Anderson was born in Lynbrook, New York. He is a graduate of Hofstra University and served with the U. S. Navy. He has been employed as a sales representative by Xerox and Zenith corporations.

Apply now for YCC

Applications are now available for the 1981 United States Youth Conservation Corps (YCC) program in Connecticut. The YCC is a work/education program in natural resource conservation, development, and maintenance for 15- through 18-year-old men and women from all racial, ethnic, and socio-economic backgrounds.

"The goal of the YCC program," according to Richard D. Couch, Director of DEP's Operations and Maintenance Unit, "is to perform needed conservation work on public lands while increasing our young people's understanding of their natural environment and heritage. YCC is definitely not a make-work or summer recreation program."

Connecticut offers both the residential (live-in) and non-residential (live at home, commute to work) YCC experience. For completion of the full program, YCC enrollees earn approximately $800, less normal deductions for income tax and social security and food and lodging, when appropriate. The YCC season begins on June 29 and runs eight consecutive weeks, ending on August 21, 1981.

Selection of YCC enrollees is made at random by computer from among eligible applicants. Applications and information may be obtained from: Department of Environmental Protection, YCC program, 165 Capitol Avenue, Hartford, CT 06115. The last date to obtain an application by mail is April 5. Completed applications must be received in Hartford on or before April 15. ■

> *"The Connecticut Department of Environmental Protection is an equal opportunity agency that provides services, facilities and employment opportunities without regard to race, color, religion, age, sex, physical handicap, national origin, ancestry, marital status or political beliefs."*

Record returns, new facilities highlight 1980 salmon season

By Stephen Gephard, DEP Fisheries Biologist

Will a significant run of Atlantic salmon be established in the Connecticut River by the time this decade draws to a close? Biologists involved with the Conecticut River Atlantic Salmon Restoration Program do not make predictions because they realize that there are many uncontrollable factors that may affect the program. However if 1980 is a harbinger of the decade, the future does look encouraging.

More salmon returned to the Connecticut River in 1980 than during all of the previous 13 years combined. A total of 174 fish are known to have returned to the river between late April and mid-November, compared to 60 salmon counted in the river in 1979. (Table I shows capture sites for the 1980 fish.)

A large majority of the returning adult salmon were captured at fish passage facilities at the lowermost dams. The Connecticut DEP operates the Rainbow Dam fishway on the lower Farmington River and the Leesville Dam fishway on the lower Salmon River. (The Farmington and Salmon Rivers are major tributaries of the Connecticut River within our State.) At each of the Connecticut facilities fish traps retain 30 to 36 inch long salmon while allowing smaller fish to pass upstream. The Massachusetts Division of Fish and Wildlife and the University of Massachusetts operates the trapping facility at the Holyoke Dam fishlift, the first barrier to anadromous fishes on the Connecticut River.

The completion of the Leesville fishway in June at a cost of $1.2 million was a major event for the program this year. The DEP-sponsored project lowered and capped the old 22-foot high, State-owned dam to 12 feet and constructed a Denil style fishway around its ease end. The project also included considerable dredging in the pond, grading of the river bank, and landscaping. Side benefits have been the improvement of stream bed quality, creation of a spillway safe at 100 year flood levels, and a more attractive site. Four hundred feet of the stream below the dam have been closed to all types of fishing in order to protect returning salmon.

Now that the Leesville fishway is in place, all of the three rivers that are currently being stocked with young salmon have fishtraps for the capture of the adults that return two years later. For now, all returning adults are captured and spawned in hatcheries to establish a firm foundation for the population.

A major upstream barrier was by-passed this year when Northeast Utilities completed a series of three fishways, at a cost of $15 million, around its Turners Falls, Massachusetts, dam on the mainstem Connecticut River upstream of the Holyoke Dam. Although salmon will be captured at Holyoke for many years to come, American shad -- another fish targeted for Connecticut River restoration -- are allowed to pass and they now can use the Turners Falls fishways to ascend the river up to the Vernon, Vermont, dam where a fishway is expected to be completed for the 1981 run.

When adult salmon were captured at the dams this spring, they were initially transported to the Berkshire National Fish Hatchery in Great Barrington, Massachusetts, to await fall spawning. The hatchery was soon filled to capacity and additional fish were trucked to a quarantine facility at the DEP's Quinebaug Valley Hatchery in Plainfield and to Massachusetts' Roger J. Reed Hatchery in Palmer.

Late October and early November salmon spawnings yielded 311,600 eggs of what is called the "Connecticut River strain": i.e., both the parents returned to the Connecticut River. It is hoped that "Connecticut River strain" salmon will exhibit higher return rates than the other strains of salmon stocked since these fish may have inherited the traits that allowed their parents to successfully return to the river.

In addition to the pure Connecticut River strain eggs, hundreds of thousands of eggs from other sources have been obtained, adding up to a strong egg year class and, it is hoped, a large group of young salmon to stock in 1983. One reason for the high 1980 egg take was that Atlantic salmon rivers throughout North America had excellent runs this year and surplus eggs were easier to obtain.

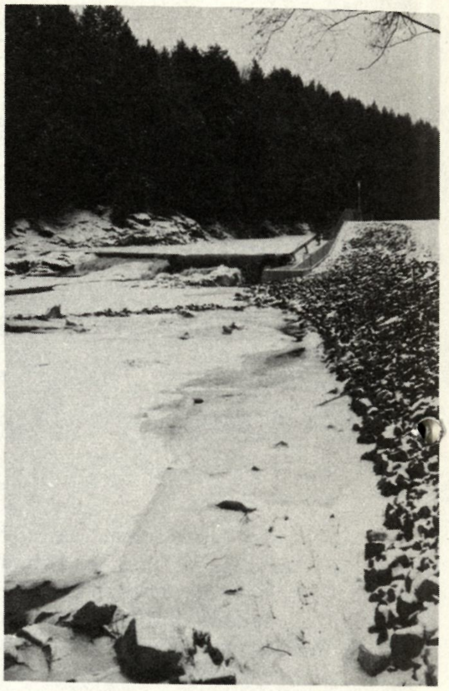
Biologists assume that some strains of salmon are better suited for the Connecticut River than others, but they have not been able to make definite conclusions because they have lacked an effective means of identifying the different strains of salmon stocked. In 1980, equipment for inserting internal, coded nose

Table 1

1980 salmon capture sites in Connecticut River watershed

Site	Number of Fish	Comments
Holyoke Dam Fishlift (Connecticut River)	124	Taken to hatcheries
Holyoke Dam Fishlift	2	Escaped upstream
Rainbow Dam Fishway (Farmington River)	26	Taken to hatcheries
Leesville Dam Fishway (Salmon River)	1	Taken to hatchery
DEP pound net-Old Saybrook (Long Island Sound)	1	Taken to New England Aquarium in Boston
Angler Catches:		
Long Island Sound, Westbrook	1	Dead when obtained
Roaring Brook, Glastonbury	1	Angler reported but kept
Connecticut River, Enfield Dam	1	Dead when obtained
Connecticut River, Holyoke Dam	1	Dead when obtained
Farmington River, Windsor	1	Died shortly after obtained
Found dead by the public (various sites along the Connecticut and Farmington Rivers)	15	Carcasses given to DEP
	Total 174	

tags in all future stockings of young salmon was obtained. The tags do not appear to harm the fish, they are rarely lost, and they allow each adult salmon to be identified by its genetic strain, hatchery of origin, release site, and other factors. This will greatly help the strategic planning of the program if, for instance, one strain exhibits a high rate of return while another strain shows a low return rate. Biologists would know that they should increase the numbers of the first strain that was stocked.

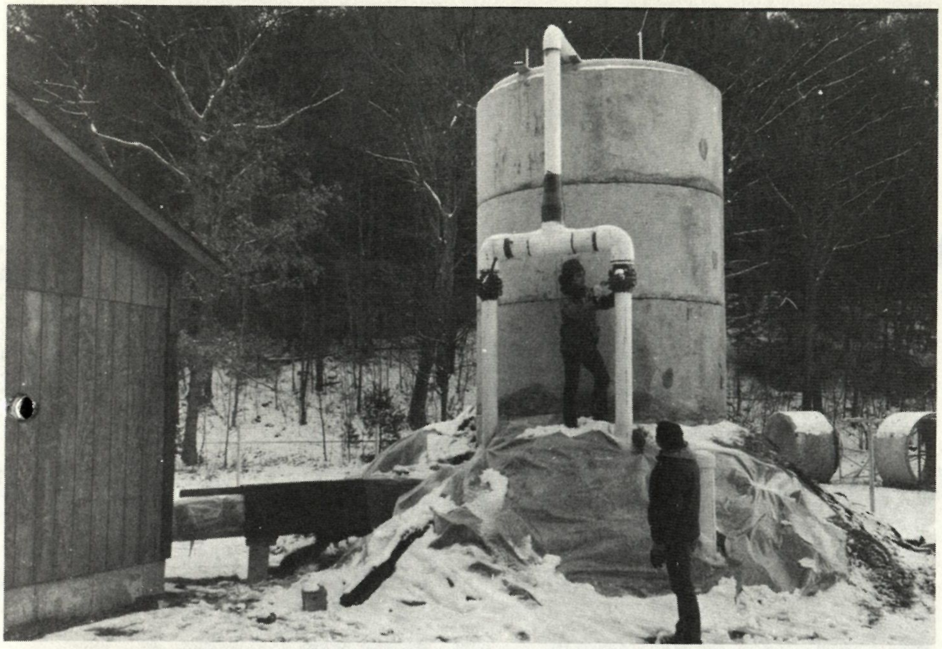


Stephen Gephard photos

Completion of the Leesville Dam fishway means that all three rivers currently being stocked with young salmon have fishtraps for the capture of returning adults.

It has become clear that additional space is needed to hold the increasing numbers of returning adult salmon. Luckily, this need was anticipated and, as this is being written, the DEP is putting the final touches on an adult salmon holding facility in Peoples State Forest in Barkhamsted. This is not a hatchery, but a facility specially designed to hold and treat adult salmon awaiting spawning. Eggs will be transferred to hatcheries for rearing. Cold, high-quality well water will individually feed each of 23 concrete pools inside the building, and a small staff will live on-site to monitor the fish. This facility will be on-line for the 1981 run and is expected to have a capacity of 250 adult fish.

The facility will also be used to "recondition" kelts, the name given to Atlantic salmon that have spawned. Unlike Pacific salmon, Atlantics are able to survive spawning and, in nature, if they are able to reach the ocean before they die of exhaustion, they will resume feeding. Atlantic salmon do not normally feed in fresh water. However, biologists from Nova Scotia have pioneered techniques that prompt kelts to feed in fresh-water hatcheries so that the fish will fatten up and produce another batch of eggs. After visiting Canadian biologists conferred with biologists from the Connecticut River program last summer, it was decided that this so-called



Aspirator aerates water for new adult salmon holding facility, at left, in the Peoples State Forest. Facility will be able to hold and treat up to 250 adult salmon while they await fall spawning.

"reconditioning" would be tried with the 1980 kelts.

In summary, 1980 was an exciting year for the Connecticut River Atlantic Salmon Restoration Program. A record number of fish returned, a record number of eggs were taken, two dams were equipped with fishways, a holding facility was completed, and new techniques have been explored.

The program is coordinated by the four Connecticut River Basin states and two federal agencies, the U.S. Fish and Wildlife Service and the National Marine Fisheries Service. Within the State of Connecticut the program is operated by the DEP's Marine Fisheries staff with valuable assistance from the Inland Fisheries staff and the Burlington and Quinebaug hatcheries. The program has also benefited from help from other DEP units: Region I, Region III, Region IV, Penwood State Park, the Law Enforcement Unit, the Information and Education Unit, the Natural Resource Center, the Radio Room Communication Center, the Youth Conservation Corps, and the Young Adult Conservation Corps. On the Environmental Quality "side" of the DEP, assistance was also provided by the Air Quality Monitoring Unit's welding shop. It would take a full page to list everyone's name, but thanks go out to all who have contributed to the production of those 311,600 eggs, the beginning of the Connecticut River's Atlantic salmon run of the next decade.

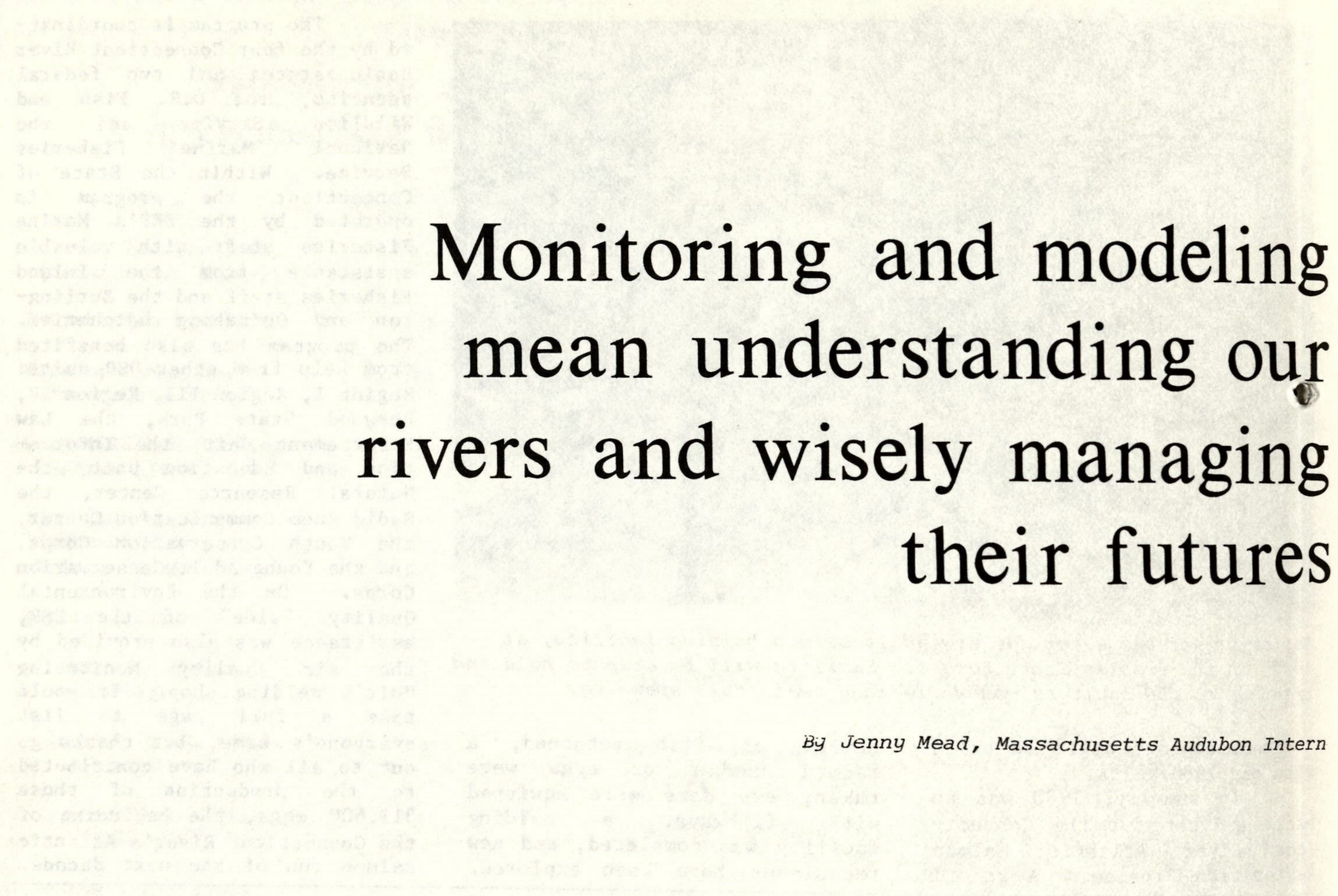
Whale watching season

Greenpeace, the worldwide environmental group known for its work on protecting whales, will embark this spring on some of the more pleasant encounters with the whales. Thousands are expected to take their spring "whale watch" trips from Plymouth and Provincetown harbors, beginning Saturday, April 11.

1981 Spring Whale Watch Schedule

Day-Date	Time	Vessel	Port
Saturday, April 11	10:30 AM-1:30 PM	Dolphin Fleet	Provincetown
Sunday, April 12	10:30 AM-1:30 PM	Dolphin Fleet	Provincetown
Friday, April 17	3 PM-7 PM	Dolphin III Fleet	Provincetown
Saturday, April 18	3 PM-7 PM	Dolphin III	Provincetown
Sunday, April 19 (Easter)	6 AM-10 AM	Dolphin Fleet	Provincetown
Friday, May 1	3 PM-7 PM	Dolphin Fleet	Provincetown
Friday, May 15	10 AM-5 PM	Cape Cod Princess	Plymouth
Sunday, May 17	7 AM-1 PM	Cape Cod Princess	Plymouth
Sunday, May 24	3 PM-7 PM	Dolphin Fleet	Provincetown
Monday, May 25 (Memorial Day)	6 AM-10 AM	Dolphin III Fleet	Provincetown
Friday, June 5	10 AM-5 PM	Cape Cod Princess	Plymouth
Sunday, June 7	7 AM-1 PM	Cape Cod Princess	Plymouth
Friday, June 19	10:30 AM-1:30 PM	Dolphin Fleet	Provincetown

Ticket prices are $20 for adults; $17 for senior citizens and students; children under 5 free. Proceeds help continue the work of Greenpeace in protecting whales and their wide spectrum of other environmental activities. Contact Greenpeace at (617) 542-7052 for further details.



Monitoring and modeling mean understanding our rivers and wisely managing their futures

By Jenny Mead, Massachusetts Audubon Intern

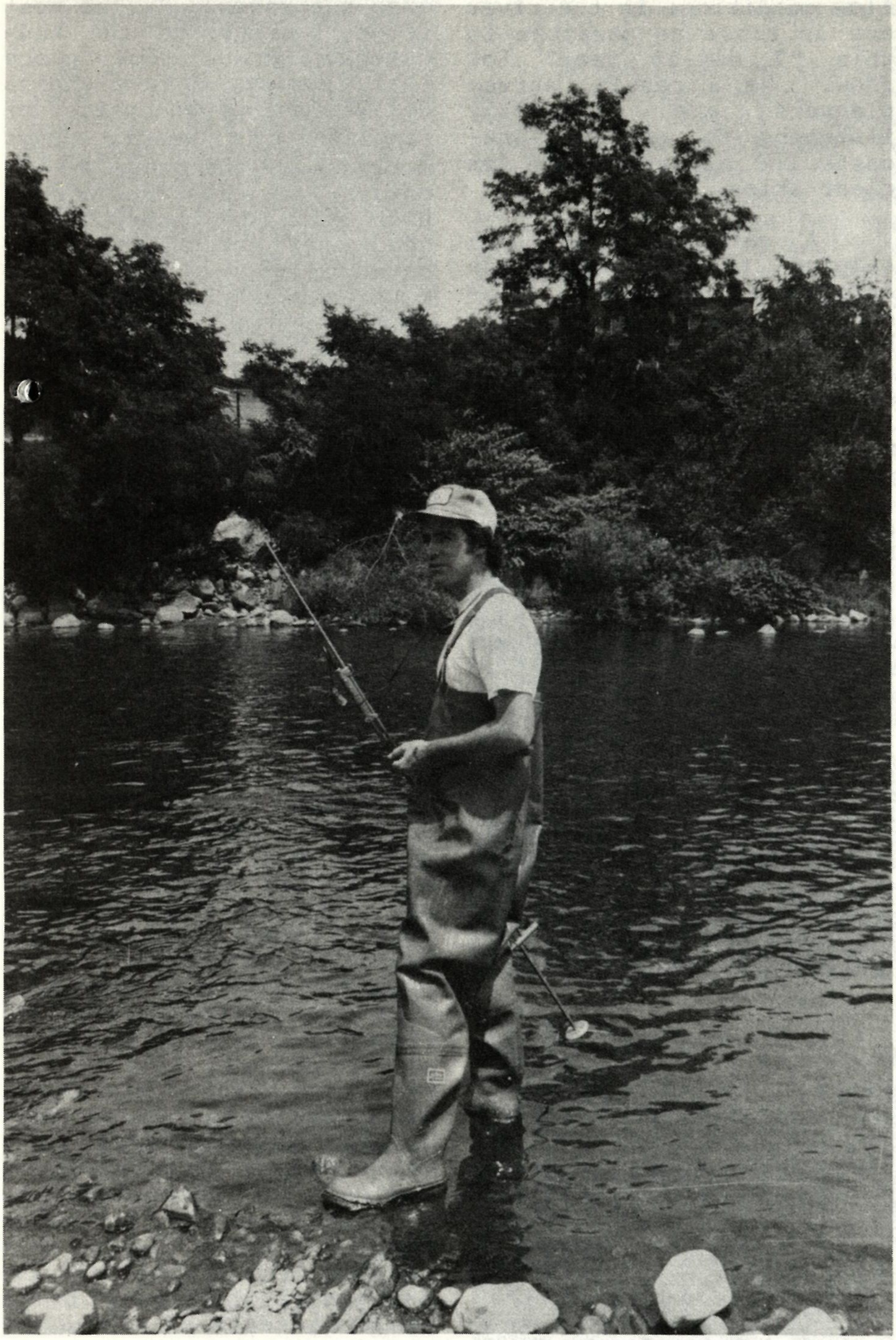
The man wading in the photo is not fly-fishing, nor is he panning for gold. The sight of him provokes questions from passersby and attracts the attention of passing policemen who occasionally stop to ask him what on earth (or in water) he is doing.

In a broad sense, this man -- Tom Morrissey, an Engineer for DEP's Water Compliance Unit -- is helping to determine the future of Connecticut's Naugatuck River. Specifically, Morrissey is measuring the flow rate, velocity, and depth of the river, information that will be used in a mathematical model. These measurements are a part of the intensive surveys being made of polluted waterways throughout Connecticut, surveys which contribute to the Water Compliance Unit's efforts to clean up polluted rivers in the State.

Understanding such an intensive water quality survey requires some geography and history. The main stem of the Naugatuck River is formed by the confluence of its East and West Branches in Torrington. From Torrington the river flows in a southerly direction approximately 40 miles to its junction with the Housatonic River in Derby. The river drains approximately 300 square miles of western Connecticut and is tidal at its mouth. By the 1950s, both municipal and industrial discharges, containing heavy metals, rubber, and organic discharges, were pouring into the river, rendering it unsuitable as an aquatic habitat.

In 1972, the State Department of Environmental Protection, with the help of federal and local officials, began a clean-up program which involves millions of dollars for upgrading municipal and industrial waste treatment facilities. Under these programs, municipal sewage treatment plants were improved to secondary treatment levels (meaning 80 percent removal of carbonaceous wastes as well as 85 percent removal of suspended solids). Industrial dischargers were required to construct and operate wastewater treatment facilities.

The clean-up program proved relatively successful. In 1975, samples taken from the Naugatuck indicated that small populations of fish such as bass, bluegills, minnows, and trout were present in the river. A DEP biological monitoring program, started in 1974, identified facultative organisms (or-



Jenny Mead photos

ganisms having varying pollution tolerances) such as dragonfly larvae, leeches, and worms, which proved that the clean-up efforts had succeeded to some degree.

Today, for the 12 miles from its source in Torrington to the Plume and Atwood Dam in Thomaston, the Naugatuck River is rated in the "Water Quality Standards" for the State of Connecticut as Class B, complying with the minimum surface water quality standards the State has adopted. Class B indicates good water quality suitable for boating and other recreational activities and excellent as fish and wildlife habitat.

Unfortunately, for the 28 miles from the Plume and Atwood Dam to the Housatonic River the water quality of the Naugatuck is degraded to Class C, or suitable for only limited recreational use of the water for boating and non-contact sports. At present, the State is studying methods of upgrading this segment of the river to Class B status.

As a result of intensive surveys and the biological monitoring program, the State has further classified the lower section of the Naugatuck River as a "water quality limited section." This indicates that the water quality does not meet applicable water quality standards even with secondary treatment levels. This does not mean water quality standards will not be met, but that measures beyond best practicable or secondary treatment will be needed to meet these water quality standards.

The primary problem affecting Naugatuck River water quality is the eight municipal sewage treatment plants and the numerous industrial treatment plants which discharge along the entire length of the river.

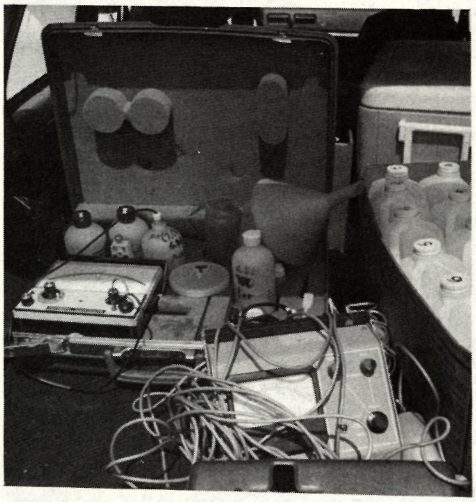
Under Water Compliance's primary monitoring program, the river receives a regular monthly "check-up," conducted at two sampling stations. In addition, the Unit has been conducting intensive surveys, beginning in 1974. The surveys are usually conducted during summer months because, in the warm weather, critical water quality conditions exist due to elevated water temperatures and low flow conditions.

The intensive survey work is conducted to gather chemical and hydraulic data which will be used to develop a mathematical model. With the aid of a computer the Water Compliance Unit uses a series of mathematical equations to simulate the water quality system of a river. Data from the surveys are fed as variables into the equations, and solutions are compared to actual water quality conditions in the river. Then, after a series of adjustments or iterations, the mathematical model is calibrated to the specific river under investigation. When this process is completed, the water quality impacts of sewage and industrial discharges to the river can be duplicated in the office with computer programs run by Water Compliance engineers.

One of the key variables modeled is dissolved oxygen (DO). This constituent is a primary indicator of water quality because of its impact on the aquatic community. Bacteria use DO to assimilate and degrade wastes, causing instream levels of oxygen to drop. At times this oxygen uptake can be so great that normal diffusion from the atmosphere cannot keep up and severe depletion or "oxygen sags" result. This depletion, if severe enough, can stress or even kill fish and other aquatic organisms and result in noxious odors. For this reason, the State Water Quality Standards stipulate minimum concentrations of DO to be maintained in all Class B fishable/swimmable streams. This minimum is used by modelers to determine whether water quality is acceptable or below standards. The model is used as a planning tool to assess treatment schemes and develop effluent limitations for each discharge. This is called load allocation analysis.

When making load allocations for any given river system, the State of Connecticut uses the statistical low flow which would occur over a seven day period once in every ten years. The Department of Environmental Protection tries to plan intensive surveys so that flow conditions in the river are as close as possible to this "7 day-10 year" low flow. As a result, survey planners are constantly listening to weather forecasts and always hoping for clear skies.

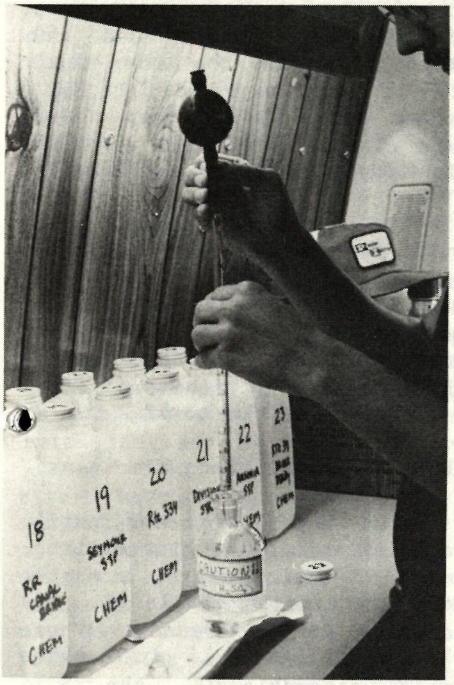
A waterway cannot be sampled to determine the effects of individual discharges after heavy rain because of the high flow and also because elevated organic bacteria concentrations occur when waste washes from the streets into the storm sewers and then into the river. In the most recent survey of the Naugatuck, which took place last summer, heavy rains delayed the second period of sampling four weeks. Says Morrissey, "We have to be patient when we run into a high flow situation. We need a low flow for these surveys, so we just have to be flexible."



Surveying the entire river takes two weeks, although only three to four days of each week are devoted to around-the-clock monitoring. During the first week, the survey team, headed by Morrissey and Senior Environmental Analyst Ernie Pizzuto and composed of Water Compliance staff, engineers, interns, and field workers, monitors the 20-mile stretch of the river from Waterbury south to Derby. During the second week, the Naugatuck from Torrington to Waterbury is monitored. From four to six people are on for each of three eight hour shifts per day. At the start of each shift, they meet at the Unit's monitoring van, equipped with the necessary chemicals and sampling materials.

From the monitoring van, two teams go to designated sampling spots along the river. Carrying a carload of measuring instruments, gauges, and water sample bottles, one team samples the river at the designated stations, doing chemical tests to determine the temperature, pH, and amount of DO. Using meters, the samplers can instantly determine this information which is recorded for input into the model. Samples of water are also taken for laboratory analysis of BOD_5, a standard five-day test determining the biological and chemical oxygen demands of organic wastes contained in the water.

In nine different places along the river, the



second team is responsible for gauging, measuring the river's flow rate, velocity, and depth. A wire, marked off at specific intervals, is stretched across the river. Donning chest waders, one of the workers fords the stream slowly, calling out the information at each interval to the member of the team who sits on the river bank. It is slow work -- the marked intervals are either two or five feet apart; the river width as much as 300 feet; and simply getting the flow rate at each marking takes anywhere from 40 to 70 seconds.

Sewage also contains ammonia and as the ammonia level rises, the threat of ammonia toxicity increases. The toxic properties of ammonia to fish and other aquatic organisms are enhanced by elevated pH values. During the summer months, elevated pH values are often present in organically enriched rivers as a result of algal productivity which affects the carbon dioxide buffering system present in surface waters. The temperature is important because the ability of oxygen to remain dissolved in water decreases as the water temperature increases.

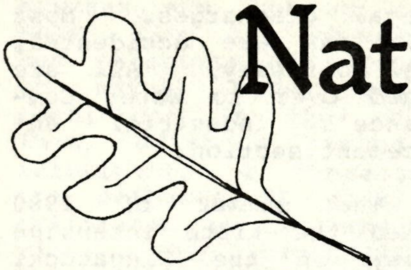
In addition to the DO, pH, and temperature measurements, three water samples are collected in bottles at each of the first team's stations. One sample will be used for the BOD_5 test; the other two samples, one for metal content and one for chemical content, are fixed with acid for preservation. All three samples are given to the State Health Department for testing. With three separate runs, "we handle over 200 bottles in the course of the three day survey," says Morrissey.

Traipsing up and down Connecticut rivers has its exciting moments. Survey team members report close calls with speeding trains on bridges, people taking pot-shots with rifles, and the "interesting" remarks from policemen who may come across samplers dumping buckets into the river from bridges at odd hours of the morning. On one trip, Morrissey and Pizzuto discovered a "shopping cart graveyard" -- 50 shopping carts that had been rolled down a culvert into the river.

River surveys also occasionally turn up water quality violations such as illegal discharges. Most violations are accidental, says Morrissey. All are turned over to Water Compliance's industrial enforcement section.

The summer of 1980 marked the fifth intensive survey of the Naugatuck. Survey team members included Morrisey, Pizzuto, principal sanitary engineer Ron Waghorn, sanitary engineers Mike Curtis and Art Mauger, environmental analyst Lee Dunbar, publicist Tess Gutowski and interns Eilleen Ray, Allen Carey, Joan Keeney, and Terry Spear.

"The survey is a long-term project," says Morrisey; anywhere from six to 12 months are required to feed the data into the mathematical model. Results will then be used by design engineers in altering the treatment plants to meet effluent standards. The entire process is time-consuming and lengthy; however, the intensive surveys and models, says Morrissey, are important "in attaining a complete understanding of the river. The work we do now will help establish a viable water quality management plan that will govern the fate of the Naugatuck long into the future." ■



Nature Notes

by Penni Sharp

Life in the river

Connecticut has a number of rivers and streams that flow through the State and eventually discharge into Long Island sound. Many of these watercourses have their origin within the State, but some of our larger rivers reach Connecticut after flowing through states to our north.

Rivers diversify the landscape. Their ever-changing nature provides constantly shifting scenes. A high flowing spring river extending to the limits of its floodplain offers a very different picture than the same river in late August after a dry spell.

Rivers are of economic importance. Early settlers used Connecticut's rivers as avenues for travel and trade, and many of Connecticut's oldest towns are in close proximity to navigable waterways. Rivers are the location of much of Connecticut's industry, and rivers large and small were dammed in many places along their reaches to provide power for mills and factories. Today's industries use rivers for the discharge of wastewaters or for industrial cooling. Still used in some locations, the energy of flowing watercourses may become an increasingly important source of electric power.

An obvious distinction between streams and rivers and other freshwater bodies such as ponds, lakes, swamps, and bogs is the movement of water. Generally speaking, streams and rivers are lotic, or running, whereas ponds, lakes and swamps are lentic, or calm. Nonetheless, water in the fastest stream can eddy into a backwater forming a still pool, and lake water can be set in motion on a windy day, so gradients exist in all water systems.

Life in fresh-water streams must adapt to a constantly changing environment in order to survive. Compared to the essentially closed or self-contained systems of lakes and ponds, a river or stream is an open system. It constantly receives new water and nutrients which pass on toward the sea.

There are several characteristics of watercourses that are important to all forms of life that are associated with a lotic environment. Among these are the one-directional, continuous flow of the waters, the continual mixing or turbulence, changing velocities, fluctuation in the levels and breadth of the waters, changes in light and temperature, and the instability of the bottom. Clearly a river or stream is not an easy environment in which to live!

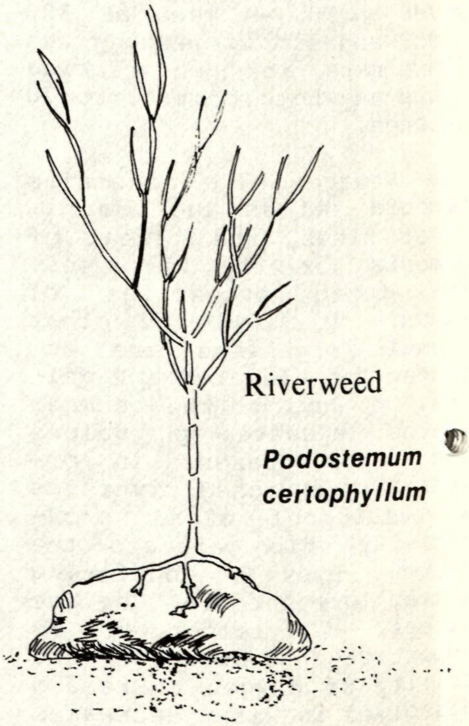
Anyone who has observed rivers and streams has noted surfaces dimpled with eddies and whirls and breaks in the water. Many factors influence the motion and mixing of waters -- every change in elevation, any fallen log, rock or bend can cause turbulence. Due to this constant mixing, organisms found within the water will not likely remain at a given level, and maintenance of position is perhaps the greatest problem facing life in a stream or river.

A problem that stream organisms do not ordinarily have to contend with, however, is lack of oxygen. In shallow, moving waters, there is a continuous exchange of gases between the water and the atmosphere, and the water tends to be well oxygenated. Only after heavy rains, when rivers are clogged with silt and mud, is oxygen in short supply.

Rivers and streams are closely involved with the life along their banks. Overhanging vegetation drops seeds and pollen into the waters and supplies food to some stream inhabitants. Predators enter streams from the banks, and at varying times of the year, bird life is active along riverbanks.

In the extraordinarily complex and challenging environment of lotic waters, a number of interesting plants and animals can be found. These living things fall into three main categories: the free swimmers, the drifters, and the fixed or sessile organisms.

Anyone who has waded barefoot into a stream has probably encountered slippery rocks. Microscopic plants, diatoms and algae, occur in large numbers, sometimes causing the bottom to appear brownish or yellowish. Swift water diatoms, one-celled animals with silicaceous cell walls, have special adaptations for withstanding currents. Some



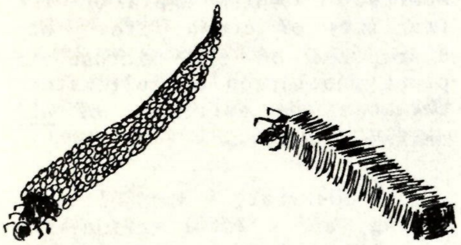
Riverweed

Podostemum certophyllum

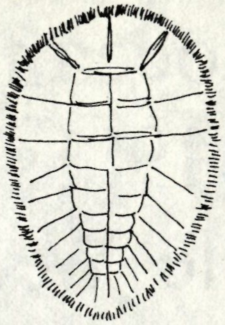
anchor to the bottom by means of gelatinous stalks. Long strands of filamentous algae such as Cladophora may stream from rocks. Although in this fast moving environment it is difficult for rooted plants to become established, a few species are able to anchor themselves. Among these are riverweeds (Podostemum sp.) which grasp rocks with their roots and often form thick, spreading masses. When present these plants may harbor a number of aquatic invertebrates.

Animals of streams and rivers have a number of unique adaptations that enable them to withstand the force of the currents. Some are strong swimmers. Those that are not may have flattened or streamlined bodies or strong claws for clinging. Some have special glands that enable them to spin threads for attachment purposes or suckers that hold them securely in place.

Many stream animals depend upon what passes downstream for their food supply. Some of these animals are equipped with specialized body parts that enable them to filter their food from the water. Some species of Caddis fly larvae, for example, spin nets which they spread against the current in order to entrap food.



Caddis fly larve



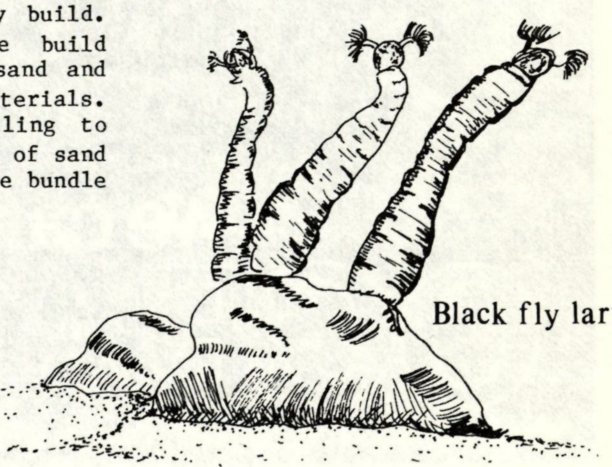
Water penny

Water pennies (Psephenus sp.) are the larvae of beetles. They are thin, ovate copper-colored organisms, which cling to rocks by means of suction. Following pupation, the adults leave the water for a terrestrial existence, returning only in order to lay their eggs.

Other insect larvae that cling to rocks are the black flies (Simuliidae). The worm-like larvae are about half an inch long and have feather-like brushes on their heads that enable them to strain food from the water. Sometimes black fly larvae are so numerous that the rocks appear to be covered by clumps of dark moss. As adults, black flies are perhaps the most annoying insect pest around as the females inflict painful, itching, bleeding bites on humans and other mammals.

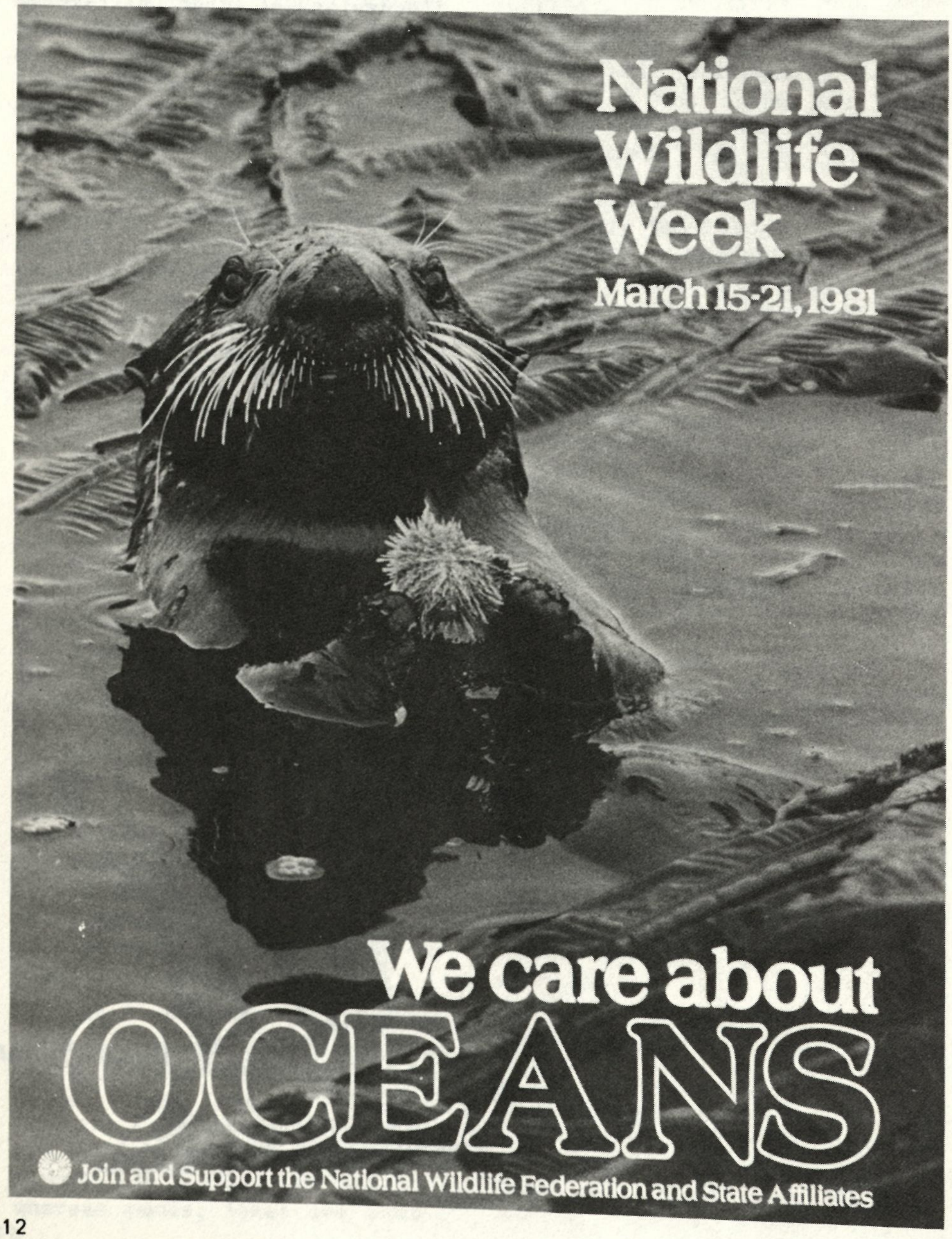
Caddis flies (Order Trichoptera) are aquatic throughout their immature life. The caddis fly larvae are known for the cases that they build. Stream dwelling larvae build cases out of bits of sand and gravel or other handy materials. It can be quite startling to observe a small cylinder of sand start to move or a minute bundle of sticks creep across a stream bed. There are numerous species of caddis fly, each constructing a different case for temporary housing in its larval stage. Some build nets as previously described, and they are a fascinating study in their own right.

A great number of insects begin life in an aquatic environment, and many of these can only be found in swift moving waters. Become acquainted with some of the insects and other small animals that inhabit our streams and rivers. A number of field guides to freshwater life are now available and will add to the enjoyment of these aquatic habitats. And see coming "Nature Notes" for a discussion of that best-known denizen of our rivers and streams, the fish. ■



Black fly larve

'We care about oceans' is the theme of 1981's National Wildlife Week


National Wildlife Week
March 15-21, 1981
We care about OCEANS
Join and Support the National Wildlife Federation and State Affiliates

The National Wildlife Federation sponsors its 44th observance of National Wildlife Week March 15-21, 1981. The 1981 National Wildlife Week Theme, "We Care about Oceans," recognizes the fact that oceans are vital to man. Oceans cover more than two-thirds of the earth, are home to over three-fourths of the world's animals, and support half of the world's plant growth.

Possibly due to the remoteness of the oceans, marine wildlife has traditionally received a comparatively small share of conservationists' attention. Every year, meanwhile, man is putting new stresses on the ocean environment as he searches for new sources of food, energy, minerals, and water to sustain a growing world population.

The oceans suport a complex web of interdependent life forms. Millions of microscopic floating plants form the base of the food "chain." These "phytoplankton" use sunlight to produce oxygen and organic matter. The phytoplankton are grazed upon by small animals, such as shrimp, which are themselves eaten by small fish. The small fish, in turn, serve as food for larger fish, marine mammals, and birds. Nearly all sea life depends, directly or indirectly, on the single-celled phytoplankton for food and energy. This explains the fragility of ocean life: any disruption of the microscopic plant population may ultimately threaten the existence of all marine wildlife.

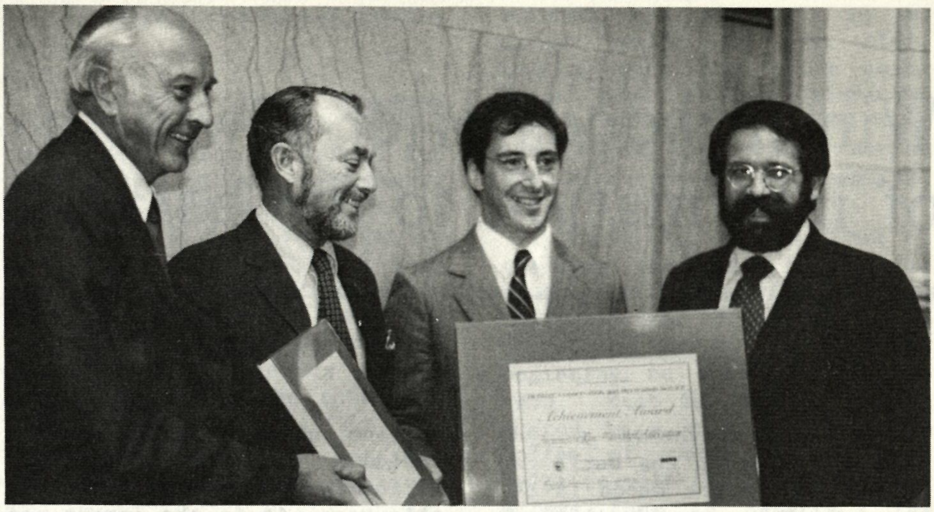
Industrial, agricultural, mining, and coastal engineering activities can cause widespread pollution of our coastal waters. Ocean pollutants include sewage sludge, detergents, pesticides, oil, acids, toxic metals (such as lead and mercury), and radioactive wastes. These pollutants can drastically alter the environmental conditions necessary for life in biologically productive coastal waters. Over-use of ocean resources is another serious threat. Many ominous signs--the near extinction of several whale species, the declining catch of important food-fish, the presence of tar-like clumps of oil on much of the Atlantic Ocean's surface--point to our unwise exploitation of marine resources and our thoughtless use of the oceans as dumping grounds.

As the earth's land areas become more crowded, man will increasingly turn to the sea for food, minerals, and energy. The sea has been called "the ecosystem of last resort." It is essential that we learn to utilize our ocean resources without irreversibly altering the natural balance that has made the sea a great reservoir of life. It's time for us to show "We Care About Oceans."

Wildlife Week's 1981 poster features the sea otter, a marine mammal that has recovered from near-extinction 70 years ago. The sea otter (Enhydra lutris) grows to from three to five feet long and 50 to 80 pounds. It lives in shallow Pacific waters from California to Alaska. Thousands were killed in the 18th and 19th centuries for their prized brown fur. By 1911, there were few sea otters alive and an international treaty was signed for their protection.

Over the past 70 years, California's sea otter population has made a remarkable recovery. Today some fishermen contend that the sea otter, a voracious shellfish eater (an adult may eat 15 pounds of sea urchins, mussels, clams, and abalone per day), is hurting the shellfish industry and putting people out of work. Sea otter supporters claim that by controlling populations of shellfish that graze on kelp the sea otter preserves the diverse productive kelp forest community which is the home of many commercial fish and shellfish. ■

The National Wildlife Federation offers a Wildlife Week slide show including 53 color slides, tape cassette, script, teacher's guide. Copies are $9.95 from: National Wildlife Federation, 1412 16th St. NW, Washington, DC 20036.



Dawn Dickieson photo

The Farmington River Watershed Assn. is the first Connecticut organization to receive the U. S. Dept. of Interior's Heritage Conservation & Recreation Service Achievement Award. HCRS reg. dir. Robert W. McIntosh, Jr., right, presented it to former FRWA dir. Roger Seamans, pres. Culver Modisette, and ex. dir. Ronald Pfeffer.

Quinebaug fishing ponds open

The public fishing ponds at the Quinebaug Valley Hatchery opened on March 7 and will be open thereafter on weekends and holidays. Admission to these ponds is by permit only, and regardless of vacancies not more than one permit per day per fisherman will be issued.

The public fishing facility at the Quinebaug Valley Hatchery consists of two ponds, each two acres in size. One pond is restricted to fly fishing with a single barbless hook, and the other pond is restricted to fishing with lures equipped with a single barbless hook. Each pond is stocked with more than 1,000 trout from 9 inches up to more than three pounds.

This year there has been a change in the method of obtaining permits. Reservations can now be made by telephoning 566-2287 or writing the Fisheries Unit, Room 255, State Office Building, Hartford, Conn. 06115. Reservations must be made no later than 4:00 p.m. of the Wednesday preceding the desired reservation date. Permits will be issued at the ponds on the day reserved.

Permit holders will be allowed to fish for up to three hours. There will be three periods, 8:00 a.m. to 11:00 a.m., 11:30 a.m. to 2:30 p.m., and 3:00 p.m. to 6:00 p.m., until April 30. Beginning on May 1, there will be four periods, 6:30 a.m. to 9:30a.m., 10 a.m. to 1:00 p.m., 1:30 p.m. to 4:30 p.m., and 5:00 p.m. to 8:00 p.m.

Any vacancies for which no permits were issued will be filled on a first come, first served basis. However, such vacancies will not be filled until 15 minutes after the start of the period. Reservation holders who do not appear within 45 minutes of the start of the permit period will lose their permit privilege, and these vacancies will be filled on a first come, first served basis.

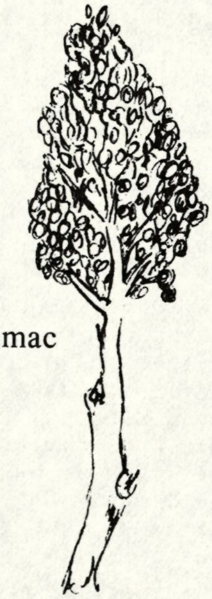
Anglers are allowed to catch and release any number of fish and are allowed to continue fishing (within the three hour period) until one fish is killed or creeled. Last year some fly fishermen caught and released as many as 60 fish during three hours of angling.

This is an excellent opportunity to sharpen up your skills before the regular season opens and the cost is only $1. Juveniles under 16 years of age must be accompanied by a licensed angler over 21 years of age and must also pay the $1 fee. ■

Winter woods offer a wealth of information to the botanist

By G. Winston Carter; illustrations by Pamela Carter

I once overheard a lady comment, "What in the world can anyone see in the woods in the winter?" The answer is that you can see a great deal if your senses are alert to what is around you.

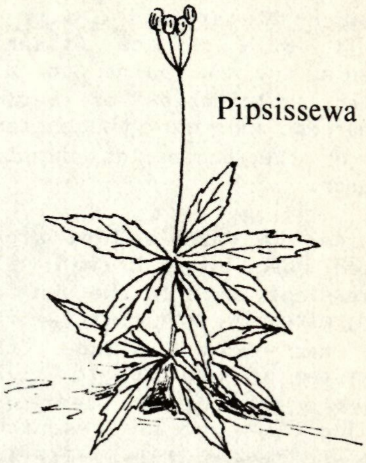


Staghorn sumac

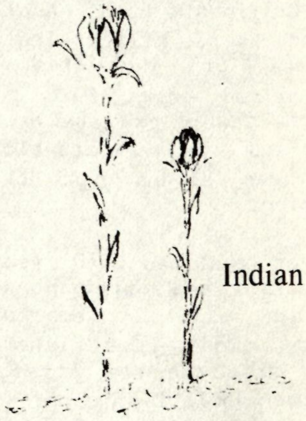
The path that I take leading into the winter woods leads me through an old field that is starting to return to the forest condition. Old field, or gray birch (Betula populifolia), cedar (Juniperus virginiana), black cherry (Prunus serotina), and silky dogwood (Cornus amomum), all light-loving plants, are indicators of this process. As I approach the edge of the woods I pass by a clump of staghorn sumac (Rhus typhina) with its red fruit still persisting during the winter months. Here, this plant is a part of the ecotone, which is a term used to indicate an area where two different environments meet. In this case, it is the forest and the old field. An ecotone may produce what is known as the edge effect, meaning that often more animal life is found here than in either the field or the deeper woods. These animals have the best of two worlds to satisfy their needs for food and shelter.

The vegetation a short distance into the woods changes rather dramatically. The sun-loving gray birches are still present but they are in various stages of disarray . . . the place looks like a disaster area with the birches bent over every which way and many of them covered with birch conks, or shelf fungi (Polyporous betulinus), hastening the process of decay. A jungle of catbrier (Smilax rotundifolia) is intertwined with the birch. Red maple (Acer rubrum) is pushing its way skyward to seek its place in the sun at the expense of the birch. The maple, which is shade tolerant, has gradually become successful as the predominant species where it competes with the birches for sunlight. The birches, unable to stand the shade, are gradually losing their struggle for survival.

Birch conks



Pipsissewa



Indian pipe

On the opposite side of the path, picturesque pitch pines (Pinus rigida) with gnarled and drooping branches are present in some abundance. They too are sun-loving plants, but they have not yet run into any competition, which would inevitably result in their fate being the same as that of the birches. A bit further along the path the trail divides. I pause for a minute to inspect the remains of a clump of Indian pipe (Monotropa uniflora) in its winter guise. The stems now erect are thin, black, and wire-like with tiny urn-like tops which contain the seeds. On the other side of the path, near a fork, Prince's pine, or pippsisewa (Chimaphila umbellata), with its shiny, waxy green leaves, pokes up through the snow.

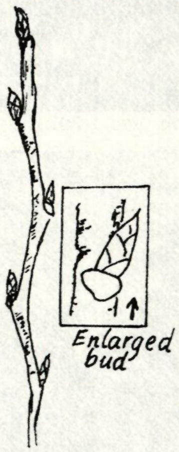
I decided to walk down the trail to my right to renew old acquaintance with a white or canoe birch (Betula papyrifera). This tree is not that common in this area, being typically a more northerly species. I rub my hand up and down the tight snow-white bark, observing the white powder which easily coats my hand. This is a simple test I use to tell this species from the gray birch which it resembles. White birch also lacks the black chevrons that are typicaly found below the branches of the gray birch. I gaze down the trail which leads to the brook. Here, yellow birch (Betula lutea) with its curly bark and an occasional American hornbeam (Carpinus caroliniana) with its muscle-like bark are characteristic of a wetter site.

I backtrack to the fork in the trail and proceed along the path to the left. As dry snow crackles under my feet, I move into a different part of the forest. Here the trees are rather sparse, with oaks (Quercus sp.) and hickories (Carya sp.) predominant. These species are more mature forest trees which usually prefer hillsides and drier soil.

A fallen oak log near the edge of the trail reveals an unusual kind of shelf fungus. I recognize Daedalia (Daedalia quercina), whose underside, where the spores lie hidden, has an interesting maze-like pattern, differing from the more common types of polypores which have many small holes on their undersurface. These plants which, like the birch conks mentioned earlier, are considered decomposers occupy an important role or niche in the forest ecosystem. They eventually reduce wood to soil which contains nutrients that will nourish new green plants, producers which in turn provide food for animal consumers. Thus the food cycle is completed, and it is constantly being repeated if the natural conditions remain the same.

The trail winds downhill and leads nearer the brook. Here I stop again to look at the bare stems of the elderberry (Sambucus canadensis). I run my hand up and down the stem to feel the warty lenticels that are characteristic of this plant. Lenticels are breathing pores that the plant uses in the winter when the leaves are no longer present to do this job.

Tulip poplar bud


American elm

I look around to examine several winter buds. For this kind of study a hand lens is helpful. One bud that intrigues me is that of the tulip poplar (Lireodendron tulipifera) which has terminal buds with only two scales, giving it the appearance of a duck's bill. A thin, zig-zag branch of a nearby American elm (Ulmus americana) attracts my attention. Its buds are pointed, and they sit at an abrupt angle to the stem, looking much like dunce caps. These buds contain miniature leaves which were formed some time during the summer months and will emerge next spring.

Close by, at the foot of the elms, the rolled tips of the skunk cabbage (Symplocarpus foetidus) and false hellebore (Veratrium viride) are just beginning to show through the snow. Heat is apparently generated by a rise in the metabolism of these plants which helps to melt the frozen mud and allows them to penetrate the soil.

I am just about ready to start back home when I notice a type of jelly fungus called "witches' butter" (Tremella mesenterica) growing on a fallen log. It is a yellow gelatinous mass which is lobed and brain-like in appearance, unlike the shelf fungi. It is part of the winter rather than the summer woods because of its particular moisture and temperature requirements for growing and producing fruiting spores. Most fungi fruit at other times of year. The spores of this unusual fungus are borne on the upper surface of the lobes rather than on the undersurface as in the shelf fungi, like the Daedalia already mentioned.

Darkness is beginning to move gradually over the woods. I begin to walk briskly back to my starting point, pausing only for a moment to take a quick look at a patch of rattlesnake plaintain (Goodyera sp.), one of our native orchids, which I had missed. This plant has a striking checkered pattern on its green leaves. Glancing at the nearby brook, I notice that there are breaks in the ice, and I watch as the water bubbles out for a few moments only to disappear again under the ice.

During my return trip I ponder some of the things that I will examine more closely on another walk, especially the world of the clubmosses and evergreen ferns. ■

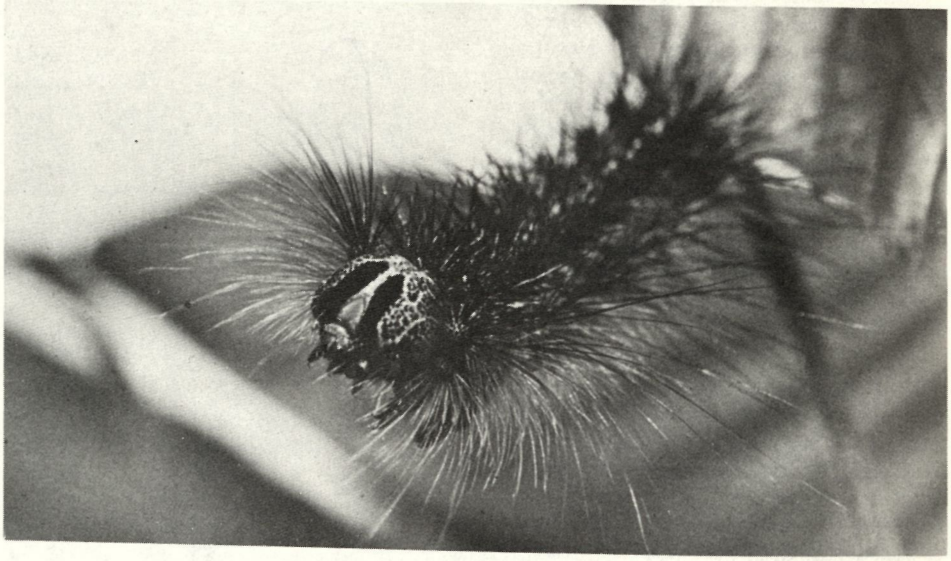
(c) 1981 Gale W. Carter

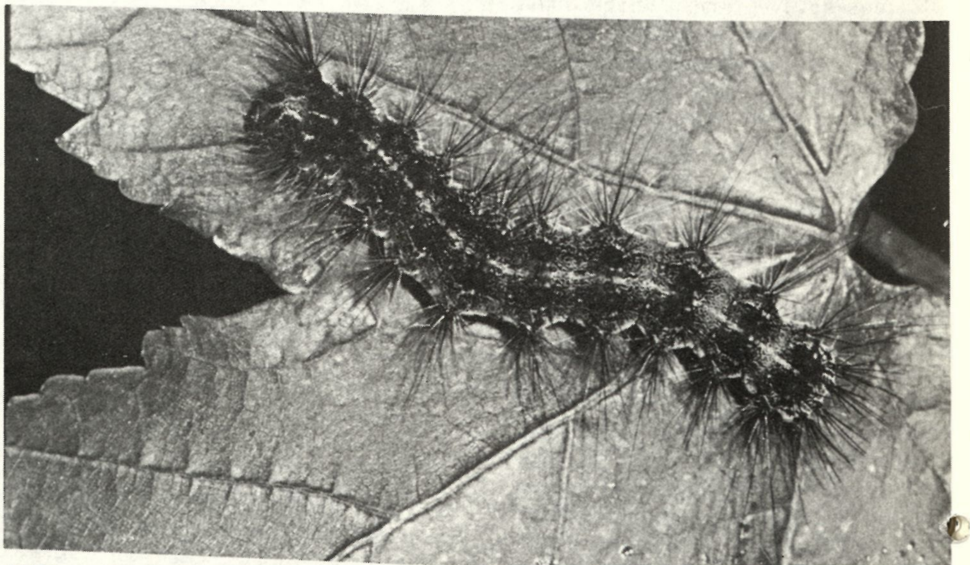
Trees versus gypsy moths: forest lab tries to even odds

By Thomas M. ODell, Research Entomologist, Forest Insect and Disease Laboratory

The scourge of the northeastern forest, the notorious gypsy moth, is again plaguing Connecticut's woodlands, parks, and residential areas. As in other parts of the Northeast (where over five million acres were defoliated in 1980), in 1981 large numbers of gypsy moth larvae (caterpillars) will be using our trees as a source of food and literally stripping trees of their life support systems, their leaves. The forest manager, home owner, and municipal tree warden will once again (as in 1971 when over 600,000 acres were defoliated in Connecticut) attempt to prevent defoliation without compromising other aspects of the environment. They will be joined by federal (USDA, EPA) and State (DEP, Connecticut Agricultural Experiment Station) agencies and conservation organizations (Audubon, local conservation-commisions).

One of these, the U.S. Department of Agriculture's Forest Insect and Disease Laboratory, located at 51 Mill Pond Road in Hamden, has been conducting research on methods to control forest insect pests since its establishment in 1955 as a New Haven-based field unit of the Northeast Forest Experiment Station. Recently, scientists at the laboratory completed a Gypsy Moth Research, Development, and Applications (RD&A) Program designed to provide techniques to minimize damage by the gypsy moth and thus increase tree survival. This became the primary research assignment of the laboratory in 1971, when severe and widespread outbreaks of this destructive insect prompted the USDA to designate control of the gypsy moth a research priority. Although specific funding for the USDA Gypsy Moth RD&A Program ended in 1978, control and management of this pest is still a primary research assignment of the laboratory. (Other major forest pests and diseases presently being investigated include the spruce budworm, the European pine sawfly, and beech bark disease.)





Roger Zerillo. U.S. Forest Service photos

At the Hamden Laboratory studies are conducted by scientists assigned to one of three research work units: (1) Ecology and Management of Northeastern Forest Insect Pests; (2) Insect Pathology and Microbial Control; and (3) Diebacks and Declines of Forest Trees. Scientists assigned to the gypsy moth problem within each unit are working together to develop integrated control systems which combine various control measures for use in specific situations. These measures are primarily biological control methods such as interrupting the gypsy moth reproductive cycle, exploiting its parasites and predators, and spreading its own host-specific diseases as well as utilizing forest management techniques to reduce gypsy moth survival and increase tree vigor.

The ecology and management unit is studying the factors and processes responsible for differences in gypsy moth population numbers and quality. Efforts are directed toward understanding the behavior of the gypsy moth, both in rural and urban situations. Scientists analyze current and historical data bases to relate gypsy moth populations to defoliation and mortality of trees. They also are developing an understanding of the influence of plant-insect relationships (i.e. nutrition, tree form, forest composition) on the dynamics of gypsy moth populations. Another aspect of their work involves assessing predators and parasites of the gypsy moth to find ways of maximizing their effectiveness in pest management systems. Such strategies may include enhancing survival of woodland vertebrate predators such as mice and shrews and/or the release of laboratory-reared parasites. In addition, studies are under way to determine the feasibility of releasing laboratory-reared sterile male gypsy moths to suppress small, isolated infestations.

Scientists in the insect pathology and microbial control units are investigating disease-causing agents and diseases of the gypsy moth and are developing practical means for using these naturally-occurring biological agents to suppress and regulate gypsy moth populations. The primary efforts are aimed at developing control procedures which involve using *Bacillus thuringiensis* and nucleopolyhedrosis viruses. During the Gypsy Moth RD&A Program special emphasis was placed on safety, production, efficacy data, and the technology needed to register the gypsy moth virus with EPA. Now that the virus is registered under the name Gypchek® emphasis has been directed toward formulation and application problems, natural transmission and autodissemination of disease-causing pathogens, and epizootiology of other naturally-occurring diseases of forest insects.

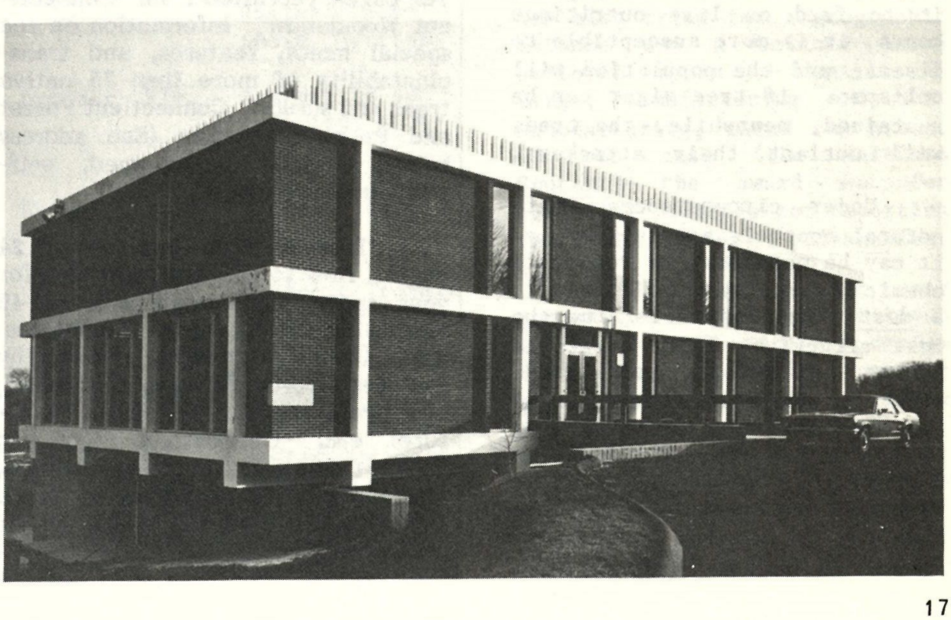
Through ecological and physiological studies scientists in the diebacks and declines work unit are attempting to determine the causes, symptoms, development, prevention, and suppression of forest tree diseases. Dieback and decline disorders are associated with environmental stresses. Besides insect defoliation, some major stresses include temperature and moisture extremes, air pollution, and nutritional imbalances. The cumulative effect of these and other factors develop differently in each tree species. The research goal has been to develop treatments and environmental manipulation measures to control oak decline and mortality thereby lessening the losses caused by the gypsy moth.

When trees are severely defoliated by the gypsy moth early in their growing season, they often produce new foliage before the season is over. Since trees must use their food (starch) reserves to obtain energy for the refoliation process, they become weakened and lose vigor. They are then vulnerable to attack by secondary agents which may ultimately cause mortality. In particular, scientists are investigating the changes in the physiological condition of the tree that enhance attacks by *Armillaria mellea*, a root-rotting fungus, and the two-lined chestnut borer. Both of these hasten the death of trees stressed by defoliation.

Scientists in the dieback and decline unit have also been mathematically comparing forests with different histories of defoliation by the gypsy moth in order to help identify forests that are most susceptible to the pest. They have been joined recently by scientists from other work units who are helping to identify the ecological and physiological conditions which characterize forest stands which differ in susceptibility to the gypsy moth.

What can be done in 81?

The gypsy moth is a native of Europe where it still periodically flourishes. It was



John Howard photo

accidentally released in Medford, Massachusetts, in 1886 and quickly established itself as a destructive pest. It is a resilient and interesting insect, surviving on a wide variety of host plants and in diverse ecological habitats. Coupled with its ability to survive is a reproductive capacity which, in concert with other factors, periodically causes population increases which exceed the constraints of its food resource. One of these periodic outbreaks will occur in 1981. And there is no proverbial silver bullet which will eliminate the pest and the damage and nuisance which it creates.

There are ways, however, to minimize the impact of the gypsy moth. The first line of defense is to know the enemy: familiarize yourself with its life cycle, habits, and natural controls. Then find out how it will affect the plants (trees and shrubs) in your yard and the surrounding woodland. For example, maples are not as susceptible as oaks; ash and tulip poplar are the least susceptible; and so on. Next, determine how best to improve your trees' chances for survival. This is very important.

The number of egg masses readily visible on trees this winter indicates the number of larvae that will hatch next spring. In the event that the gypsy moth consumes most of its primary food resource, forcing it to feed on less nutritious hosts, it is more susceptible to disease and the population will collapse. If tree vigor can be sustained, meanwhile, the trees will outlast their attackers.

Under circumstances where natural controls are ineffective it may be necessary to resort to chemical pesticides. If this is a must situation, determine the most effective, least hazardous poison to use in your yard. Chemical pesticides have broad spectrum activity, meaning they kill a wide variety of insects including beneficial ones. When misused they may also be harmful to other organisms including humans. Each state has its own pesticides regulations, so be sure to check with the State Entomologist, or the Pesticide Unit of the DEP for current recommendations.

Sources of Information. As a result of the Gypsy Moth RD&A Program the USDA recently published a series of gypsy moth handbooks (see references below). One of these, "The Homeowner and the Gypsy Moth: Guidelines for Control," (U.S. Department of Agriculture Home and Garden Bulletin No. 227, $2.00) provides excellent information about the life history and behavior of the gypsy moth, how to discourage survival and destroy life stages of this pest, and how to maintain good conditions for growing trees. Other important literature resources include "Predators of the Gypsy Moth" (U.S. Department of Agriculture Handbook No. 534, $2.90) and "Defoliation by the Gypsy Moth: How it Hurts Your Tree" (U.S. Department of Agriculture Home and Garden Bulletin No. 223, $.90).

All of these and others are available from the Superintendent of Documents, U.S. Government Printing Office, Washington D.C. 20402. For information concerning on-going research at the Forest Insect and Disease Laboratory write to NEFES, Forest Insect and Disease Laboratory, 51 Mill Pond Road, Hamden, CT 06514. Please be specific in your request so appropriate personnel can respond. For information regarding Connecticut's insect pest control regulations and recommendations, the State Entomologist (Connecticut Agricultural Experiment Station, P.O. Box 1106, New Haven, CT 06504) should be contacted. The Connecticut Agricultural Experiment Station also has an excellent publication about the gypsy moth in Connecticut; request, "The Gypsy Moth," Vol. 32, No. 3. ■

From materials prepared at the Conservation Center at the James L. Goodwin State Forest

Tree Resources

With information specific to Connecticut or the New England area

Single copies free:

"Native Trees and Shrubs for Home and Roadside Beautification." Ten pages, reprinted from "Connecticut Woodlands." Information on the special needs, features, and transplantability of more than 75 native trees and shrubs. Connecticut Forest and Park Association (See address below. Send a stamped, self-addressed envelope.)

"Trees in Your Community," 24 pages. How to pick the right tree for your spot. Landscape uses of 49 species. Chart shows silhouettes, sizes (height, breadth), noteworthy features (fruits, flowers, fall color), site preferences (soil, shade, moisture), etc. Connecticut Light and Power Company, Northeast Utilities, Communications Department, P. O. Box 270, Hartford, CT 06101. Phone 1-666-6911.

Low cost resources—worth more!

"Forest Trees of Southern New England" gives you 60 pages with 48 species described (bark, leaves, flowers, fruit, and wood). Illustrations of leaf, twig, seed. Good summer and winter keys. Study suggestions. Costs 75¢ plus tax. To order by mail, send $1.39 to cover sales tax, postage, and handling to: Connecticut Forest and Park Association, P.O. Box 389, East Hartford, CT 06108. Phone: 289-3637. (The Connecticut Forest and Park Association is a membership organization concerned with intelligent use of Connecticut lands.)

"Trees and Shrubs for Connecticut." Forty-seven pages with foliage, fragrance, fruit, sun/shade requirements, size, hardiness, outstanding characteristics indicated in chart form for more than 300 varieties of native and ornamental woody plants. Costs $1.60 from Cooperative Extension Service, Agricultural Publications, U-35, University of Connecticut, Storrs, CT 06268. Phone: 486-3334. (Make checks payable to "University of Connecticut.")

One more tree resource:

The Goodwin State Forest's Conservation Center: 455-9534. ■

For Your Information

By Martina Delaney,
Citizens' Participation Coordinator

DEP Ridesharing Award

Since 1976 the DEP, in cooperation with the State Department of Transportation, has been encouraging employers to promote ridesharing. The term "ridesharing" includes carpooling, use of public transportation, and vanpooling. Numerous companies have responded by implementing incentive programs for their employees. Some of the more popular ideas have been:

a. Distribution of literature describing carpooling, vanpooling, public transportation, and the social and economic costs of driving alone.

b. Commuter matching by home and work locations and working hours.

c. Ride-sharing and transit-promotion sessions, during which promotional materials are distributed, questions and complaints from employees are addressed, and employees interested in ridesharing meet one another in an informal atmosphere.

d. Preferential-parking incentives for carpoolers. Under this plan, carpoolers are given stickers entitling them to preferred spaces.

e. Monetary incentives.

f. Work-transit schedule coordination.

g. Distribution of monthly transit passes at cost or discount.

h. Posting of maps, schedules, and rates for available public transportation.

i. Vanpool organization. Employers purchase or lease 8- to 15-passenger vans and resell or re- lease them at cost to employees interested in organizing vanpools.

Since September 1979 DEP has been granting the Ridesharing Award to companies meriting special recognition for outstanding effort. Recipients have been:

September 1979	Southern New England Telephone, Hartford
October 1979	Aetna Life and Casualty, Hartford
November 1979	Electric Boat, Groton
Decemer 1979	Westport Transit District, Westport
January 1980	Southwest Area Commerce & Industry Assn., Stamford
February 1980	The Travelers, Hartford
March 1980	The Hartford Courant
April 1980	Union Trust, Norwalk
May 1980	Connecticut General, Bloomfield
June 1980	American Can, Greenwich
Summer 1980	Northeast Utilities, Berlin
Fall 1980	Perkin Elmer Corp., Norwalk
Winter 1981	Connecticut Blue Cross/Blue Shield, North Haven

DEP staff members familar with the efforts of employers in the state select the recipients after consultation with representatives of the State DOT, Office of Policy and Management, and others.

Different criteria are used for different awardees. Scale of effort is the most important consideration (number of carpools, etc.), and innovative programs are favored. Difficulty of implementation is also considered, however, so small or rural employers, which have more difficulties encouraging ride sharing, merit special consideration. Participation on the Ride Sharing Task Force and other boards or organizations studying or promoting ridesharing is a plus. The program has also tried for a geographic balance and a balance among employer types -- small and large, manufacturing and nonmanufacturing, rural and urban. In one case (the Hartford Courant) the award was for editorial policies and reporting favorable to ridesharing.

DEP recognizes that many companies and organizations which have not received awards are making outstanding contributions. In some cases, these organizations are being considered for future awards, but readers who know of employers who deserve, but have not received, an award are encouraged to submit recommendations. Please address recommendations to Mr. John Gove, Air Compliance Unit, DEP, 165 Capitol Avenue, Hartford, CT 06115.

Connecticut can be justifiably proud of the level of interest and activity of its employers in the promotion of ridesharing. Their efforts are making an impact on air quality, energy consumption, and traffic congestion. The Ridesharing Award is a small but appropriate recognition of a job well done.

Development and protection workshop offered

The Housatonic Valley association and the Land Trust Service Bureau have announced an all day workshop entitled "Creative Land Management, Development And Protection," to be held in Hartford on Saturday, April 4, 1981, starting at 9 a.m.

The program will invite discussion between development and conservation interests and will aim to educate development interests, regulatory agency members, and trust interests through discussions directed toward their respective problems.

At one afternoon session, speakers will address tax and legal issues, review legislation and government programs, describe ways to improve the approval process at the local level, and provide examples of how creativity has served both growth needs and protection interests.

A second afternoon session will explore the difficult question of management in terms of the options open to a trust or town once an easement or fee interest has been acquired. The discussion will center on determining the need for and value of active management, the considerations in management planning, and what assistance is available for plan development and implementation.

For further information contact the Land Trust Service Bureau (344-9897) at The Nature Conservancy, Science Tower, PO Box MMM, Wesleyan Station, Middletown, CT 06457, or the Housatonic Valley Association (672-6673) at PO Box 75, West Cornwall, CT 06796. Registration will be limited. ■

Acid rain publications

EPA has several publications available on acid rain and its effects on the environment. "Acid Rain" is the title of a new EPA publication which describes in an easy to read manner the cause, effects, legal issues, and current research on acid rain. Three research summaries are also available. "Controlling Nitrogen Oxides" and "Controlling Sulfur Oxides" discuss the causes of NO_x and SO_x emissions and their contribution to the acid rain problem, emission control technologies, and research projects. The "Acid Rain Research Summary" describes the acid rain phenomenon, environmental effects, atmospheric chemistry including transport, and national monitoring projects and research projects. All three research summaries and the new acid rain publication contain bibliographies for further reading.

In addition, three brief pamphlets on acid rain are available. They are "The Acid Precipitation Problem" which provides a brief overview of acid rain; "Acid Rain: The Time to Act is Now" which contains excerpts of a speech by Douglas M. Costle, former Administrator of EPA, at the Acid Rain Conference in Virginia in April 1980; and finally, an "EPA Journal" reprint which contains an article on acid rain by Dr. Norman Glass of EPA.

All acid rain literature is available to the public free of charge. For further information contact the U.S. Environmental Protection Agency, Office of Public Awareness, 2203 JFK Federal Building, Boston, MA 02203.

An article on Acid Rain effects in Connecticut was published in March 1980 edition of the "Citizens' Bulletin. ■

Coastal Ecology for Credit

Mystic Marinelife Aquarium and the University of Connecticut will join for the third summer to offer a three-credit course on coastal ecology.

Taught by Art Bulger, Assistant Professor of Biology at the University of Virginia, and Jim Stone, Aquarium Education Specialist, the course will meet for a week of lectures followed by five days aboard the schooner "Voyager."

Lectures will run from 2 p.m. to 5 p.m., June 8 through 12, at the Avery Point Campus of the University. For the final five days of the course, June 15-19, students will live aboard the "Voyager."

Total cost, including college credits and accommodations aboard the "Voyager," is $400.00.

For further information, contact Jim Stone at Mystic Marinelife Aquarium, Mystic, CT 06355 (536-9631). ■

Save on Woodstove Annual

John E. Hibbard, secretary-forester of the Connecticut Forest and Park Association, Inc., announced that the "Woodstove Annual" published by the Society for the Protection of New Hampshire Forest is available from the association at a substantial savings.

The publication is now available for $2.80 per copy including sales tax, postage, and handling from the Connecticut Forest and Park Association, P.O. Box 389, East Hartford, CT 06108. A savings of $1.00 is reflected in this special price.

The Association, a citizen-conservation organization which was founded in 1895, also publishes the "Connecticut Walk Book," the "Connecticut Outdoor Recreation Guide," and the "Forest Trees of Southern New England." These publications are being offered at a substantial savings at $10 which includes sales tax, postage, and handling for all three publications. ■

208 water quality management

In spring an environmentalist's fancy turns to non-point source water pollution

With the month of March now full upon us, the seemingly interminable winter of 1980 can almost be relegated to "bad memories" status. As the temperature becomes more conducive to outdoor activity it's a good time to get out and stretch your legs. It's also a good time to observe non-point sources of water pollution, because spring is when many of these pollutants are most apparent.

Let's start that walk through a typical urban setting. One of the first things that becomes apparent is the sand that's lying around, left over from the annual winter battle with snow and ice. Such sand can be found on porches, sidewalks, stairs, driveways, streets and gutters, parking lots, and anywhere else people drive or walk. Most towns attempt to recover this sand for re-use, if possible, since it's obviously a valuable resource. But if the rain beats the town crews, much of the sand will eventually wind up as a sediment in a lake or stream. And in an urban setting, the gas, oil, trash, and other debris which has accumulated over the winter will also be carried in the runoff.

As you get a little farther down the road you begin to notice that the streets and sidewalks look as if they have received a light coat of whitewash. In actuality, this is the result of salt applications from the winter. The rain will also wash this into receiving streams. Because the runoff will dilute the salt, the impact on a stream or lake is not usually severe, but in the case of ground water, salt contamination can eventually render an aquifer unfit for use as a drinking water supply.

Your hike now takes you to an area of town where a new development is under construction. The heavy equipment churning around the site has turned the area into a sea of mud. The construction workers have actually laid boards down to form temporary walkways over the mud. You remember that as a child you'd occasionally lose a boot (temporarily) to the mud that wouldn't seem to let go. With soil in such a semi-solid state, it's understandable why a spring rain can cause extensive erosion.

Fortunately, this contractor has taken precautions to lessen the erosion. Notice the hay bales which are placed around the site. They serve to slow the sediment-laden storm water, causing some of the soil to settle out, thereby lessening the impact of erosion on nearby streams. The netting staked to some of the embankments also lessens erosion.

By this time your stroll has taken you to the banks of a small stream which is at its seasonal height. That's because streams have received large amounts of runoff from rain and snow melts. At this time of year the ground is saturated with water, and stream flow is strong. During the summer months, which are normally dry, the stream flow will diminish as surface runoff diminishes and ground water provides base stream flow. The 208 Program is working to protect surface and ground water supplies by promoting ordinances for erosion and sediment control and ordinances which regulate certain land uses in aquifer areas. Because the ground water/surface water system is linked, contaminants deposited in the ground miles away can eventually make their way into the ground and surface water system within the same watershed.

Other types of non-point source pollution are also more apparent at this time of year. Agricultural runoff which contains herbicides, pesticides, and fertilizers is common in the spring. Septic system failures are also common at this time of year due to leaching field failure. ■

By Joseph M. Rinaldi,
208 Public Participation Coordinator,
P.O. Box 1088, Middletown, Ct. 06457
(203) 347-3700

Maritime heritage at Yale

Yale will offer a Summer Pre-College Program in Marine Arts and Sciences July 6 - August 14, 1981, in collaboration with Schooner, Inc.

The program directed by Yale faculty in association with Schooner, Inc., will be offered for high school students who desire broad exposure to the science, art and culture of our marine environment. The curriculum is designed to combine formal classroom work in marine science, history, art, literature, economics, and social policy with rigorous field training in similar disciplines. Students will be able to experience aspects of our maritime heritage through an introduction to boatbuilding, navigation and seamanship aboard the 66-foot sailing research vessel, J.N. Carter, during a five day circumnavigation of Long Island Sound.

The inclusive fee for the program (tuition, room, and board) is $1,500. Students will be required to live on campus in one of Yale's Residential Colleges.

Applications:
Office of Summer and Special
Programs
Pre-College Program
2145 Yale Station
New Haven, CT 06520
Telephone: (203) 436-4217 ■

coastal
area
management
71 capitol avenue hartford conn. 06115

CAM NEWS

Changing roles for Connecticut ports

Ports and harbors have always played an important role in the economic well-being of New England. From the colonial days of the wooden pinnace to the twentieth century's steel-hulled supertankers, they have been focal points for settlement, trade, industry, cities, and manufacture.

Yet changes in New England's population and economy have had significant effects on local ports. New England's population growth has not kept pace with that of other regions. Various projections of growth indicate that New England's population will continue to increase but at a slower rate than the rest of the country's. The slowdown in population growth is related to the general economic decline experienced by traditional industries during the past 30 years. Traditional manufacturing industries have been replaced by service industries and by manufacturers of computers, electronic components, and instruments, industries less dependent on waterborne transportation than the traditional industries they replaced.

In recent report by the New England River Basins Commission (NERBC) on the roles for New England ports, some findings were revealed which are particularly relevant for Connecticut's major ports. The NERBC report advises that Connecticut ports, such as New Haven, Bridgeport, New London, and Stamford, should not be directed toward service for large carriers and large cargoes. The demand for deep water ports in the State does not exist, nor can Connecticut compete with the older, established deep water ports like New York.

Connecticut ports will be better off to focus their attentions on recreation and boating activities which do not require harbor development such as dredging or crane construction. While Connecticut ports should maintain a specialized cargo capacity, they should also focus on harbor development for water-dependent industries like commercial fishing. If development of industrial ports by water-dependent industries is not feasible, port communities should consider using those sites for other water-dependent uses like passenger transportation, recreational boating, small-scale commercial fishing, sport fishing, and others which do not require deep draft ships. Port communities should also consider redeveloping sites for water-enhanced uses like hotels, restaurants, retail shops, and housing which are increased in value by waterfront locations.

New England ports are technologically out-classed by the ports of New York/New Jersey, Baltimore, and Eastern Canada, which already have the facilities to handle the largest ships and general cargoes. These ports are also better located for goods distribution to the prime manufacturing area of the country, namely the Midwest. Because technological advances in shipping have created enormous ships like the supertanker which draft as much as sixty feet of water, many New England ports just cannot handle the ships or the volume of cargo.

In addition, the trend toward "containerized" ships, which carry trailer truck bodies and are loaded by huge automated cranes, makes New England ports technologically out-dated. The investment required for terminals, cranes, and control systems is substantial. Boston, as its largest port, is the logical land center for New England. After Boston's Castle Island facility is completed, further investment in direct container facilities will not be economically justifiable for some time. Since many New England ports have common hinterlands, the prospect of more than one port providing largescale container facilities is unrealistic.

The NERBC report concludes that before Connecticut's ports concentrate on expansion of an existing port facility, port operators, city planners, and economic development officials should analyze the impact of local port activities on the local and regional economies and the potential mid- and long-term market for cargoes through the local port. For instance, in some cases it is cheaper to ship Connecticut's goods in bulk directly through New York and then bring them north by truck or train. And with Boston projected to be more than adequate for meeting New England's future needs, authorities should be cautious in determining long range goals and careful to secure viable roles for their ports. ■

Forestry film available

John E. Hibbard, secretary-forester of the Connecticut Forest and Park Association, Inc., announced that the film, "Connecticut's Gold Is Green," an 18 minute color/sound movie dealing with the wise use and management of Connecticut's forest resources, is now available for use by groups and individuals throughout Connecticut.

Interested persons should contact the Connecticut Forest and Park Association, P.O. Box 389, East Hartford, CT. 06108. ■

Public Hearings

March 23, 1981; 10 a.m.
Rm. 221, State Office Bldg.,
Hartford
To consider application of Real Estate Technology Corp., of New Canaan, to discharge wastewaters from a 300-unit condominium on Boulevard Ave. in New Haven.

March 23, 1981; 1:30 p.m.
Rm. 221 State Office Bldg.,
Hartford
To consider application of Lutheran Service Assn. of Hartford to discharge 18,000 gallons per day of domestic sewage to the groundwaters in the Town of Southbury.

March 25, 1981; 10 a.m.
Rm. 221, State Office Bldg.,
Hartford
To consider application of Ravenswood Properties to discharge 50,850 gallons per day of domestic sewage to the sanitary sewer system in the Town of Hamden.

March 25, 1981; 10 a.m.
Rm. 221, State Office Bldg.,
Hartford
To consider application of Westport Woods Equities, Inc., to discharge 22,000 gallons per day of sanitary sewage to the Westport municipal sewerage system.

March 26, 1981; 10 a.m.
Rm. 221, State Office Bldg.,
Hartford
To consider application of Playhouse Twenty Associates to discharge 6,000 gallons pr day of domestic sewage to the Town of Westport sanitary sewer system.

March 27, 1981; 10 a.m.
Rm. 207, State Office Bldg.,
Hartford
To consider application of Town of Stratford to excavate and deposit fill materials, culvert, and place riprap for storm water management within inland wetlands and watercourses within the Bruce Brook and Ferry Creek watersheds.

April 6, 1981; 10 a.m.
Rm. 221, State Office Bldg.,
Hartford
To consider application of Wolcott Electroplating Co., Inc., to discharge 4,000 gallons per day of treated wastewaters to groundwaters of watershed of Tannery Brook.

Permits Issued

Water Compliance

3/31/80: City of Norwalk
To discharge to Norwalk Harbor an average daily flow of 95,000,000 gallons per day of wastewaters. Conditions.

8/19/80: Town of Salisbury
To discharge to the Town of Salisbury sewerage system a maximum daily flow of 300,000 gallons per day of hypolimnetic water from Lake Wononscopomuc. Conditions.

8/19/80: Gerber Scientific, Inc., South Windsor
To discharge to the Town of South Windsor sewerage system an average daily flow of 11,900 gallons per day of sanitary sewage wastewater. Conditions.

8/19/80: Bridgeport Fittings, Inc., Stratford
To discharge to Long Island Sound an average daily flow of 65,300 gallons per day of wastewaters. Conditions.

8/25/80: Seaboard Metal Finishing Company, Inc., West Haven
To discharge pretreated metal finishing wastewaters to the City of West Haven sewerage system at an average daily flow of 50 gallons per minute.

8/25/80: Windsor Stevens, Inc., Windsor
To discharge spring water leakage to the Farmington River at an average flow rate of 100 gallons per minute and to discharge lagoon discharge to the Farmington River at an average daily flow of 432,000 gallons per day. Conditions.

8/25/80: Federal Business Products, Inc., Torrington
To discharge to the City of Torrington sewerage system an average daily flow of 5 gallons per day of photographic wastewaters. Conditions.

8/25/81: Baskin-Robbins Eastern Corporation, Southbury
To discharge wastewaters to a tributary to the Pomperaug River at an average flow rate of 3 gallons per minute. Conditions.

8/25/80: City of Milford
To discharge to the Wepawaug River an average daily flow of 1,200,000 gallons per day of wastewaters. Conditions.

8/25/80: City of Milford
To discharge to the Wepawaug River an average daily flow of 500,000 gallons per day of wastewaters. Conditions.

9/4/80: Ware Chemical Corporation, Stratford
To discharge to Long Brook an average daily flow of 425,000 gallons per day of cooling water at a maximum temperature of 85° F and to discharge to Long Brook an average daily flow of 800 gallons per day of vacuum cleaning condensate at a maximum temperature of 200° F. Conditions.

9/4/80: The Connecticut Light and Power Company, Enfield
To discharge to the Connecticut River an average daily flow of 1,200,000 gallons per day and a maximum daily flow of 5,500,000 gallons per day of non-contact cooling water. Also, to discharge to the Connecticut River an intermittent (stormwater) flow of runoff from fuel oil storage area. Also, to discharge to the Connecticut River an average daily flow of 3,600 gallons per day of intake traveling screen wash discharge. Also, to discharge to the Connecticut River a variable daily flow of preheating intake water at a maximum temperature of 105° F. Conditions.

9/4/80: Town of Wallingford
To discharge to the Quinnipiac River an average daily flow of 1,584,000 gallons per day of contaminated well water. Conditions.

9/4/80: Town of Bridgewater
To discharge to subsurface disposal systems in the Housatonic River Watershed a total daily flow of 5,500 gallons per day of treated domestic sewage. Conditions.

9/4/80: Chesebrough Ponds, Inc., Clinton
To discharge filtrate from a sludge disposal system to the groundwaters of the Hammonasett River Watershed. Conditions.

Reservations being accepted for 1981 camping

Fourteen hundred campsites will be available in 17 State Parks and Forests during the 1981 camping season, according to William F. Miller, Director of DEP's Parks and Recreation Unit, who says now is the time to make camping plans.

Reservation requests for the busy May 15 to Labor Day period are currently being accepted. They must be made on the official 1981 application form, by mail only. Forms may be obtained by phoning 566-2304 or by writing to: DEP, Office of Parks and Recreation, 165 Capitol Avenue, Hartford, CT 06115. There is also an application form in each copy of "Camping in Connecticut," the free folder that lists fees, addresses, rules, dates and site details. It can be obtained from the same address.

Campsite reservations must be for at least two nights but not more than 21. A check or money order for the full fee must be sent with the reservation form, payable to "Treasurer, State of Connecticut." There must be five days between the end of one stay and the beginning of the next at the same camp. The five-day wait is not required if the camper moves on to a different park or forest. Several applications may be sent in at the same time, but they must be accompanied by all necessary fees. Applications can be mailed to the Hartford address through April 15. After that applications, along with the payment, should be sent to the campground desired.

No reservations are needed from April 15 to May 14, and from Labor Day to September 30, because campsites are assigned on a first come, first served basis at all campgrounds during these periods.

Parks and rates

By legislative action fees were increased this year, with a differential fee for out-of-state campers. The parks for ordinary camping and their rates per night are: $3 per night for residents, $4 non-residents: Devil's Hopyard State Park in East Haddam, Macedonia Brook State Park in Kent, and Mashamoquet Brook State Park in Pomfret Center. $4.50 per night for residents, $6 non-residents: Black Rock State Park in Thomaston, Hopeville Pond State Park in Jewett City, Housatonic Meadows State Park in Cornwall Bridge, Kettletown State Park in Southbury, Lake Waramaug State Park in Kent, Taylor Brook Campground in Winchester, and American Legion State Forest in Pleasant Valley. (The Lake Waramaug State Park campground may be closed during the 1981 season due to the construction of new sanitary facilities. If construction can be completed, however, camping will be made available for the portion of the season remaining.) $6 per night for residents, $8 non-residents: Hammonasset Beach State Park in Madison and Rocky Neck State Park in Niantic.

Horse and rider camps

Riders who want to camp with their mounts will find 28 campsites at the Silvermine Horse Camp in Natchaug State Forest in Eastford and 20 at Frog Hollow Horse Camp in Pachaug State Forest in Voluntown. To make reservations, contact DEP's Region IV, Voluntown, CT 06384; phone: 376-2513. The campsite fee is $4.50 a night for residents, $6 non-residents at either of these camps.

DEP Citizens' Bulletin
State of Connecticut
Department of Environmental Protection
State Office Building
Hartford, Connecticut 06115

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